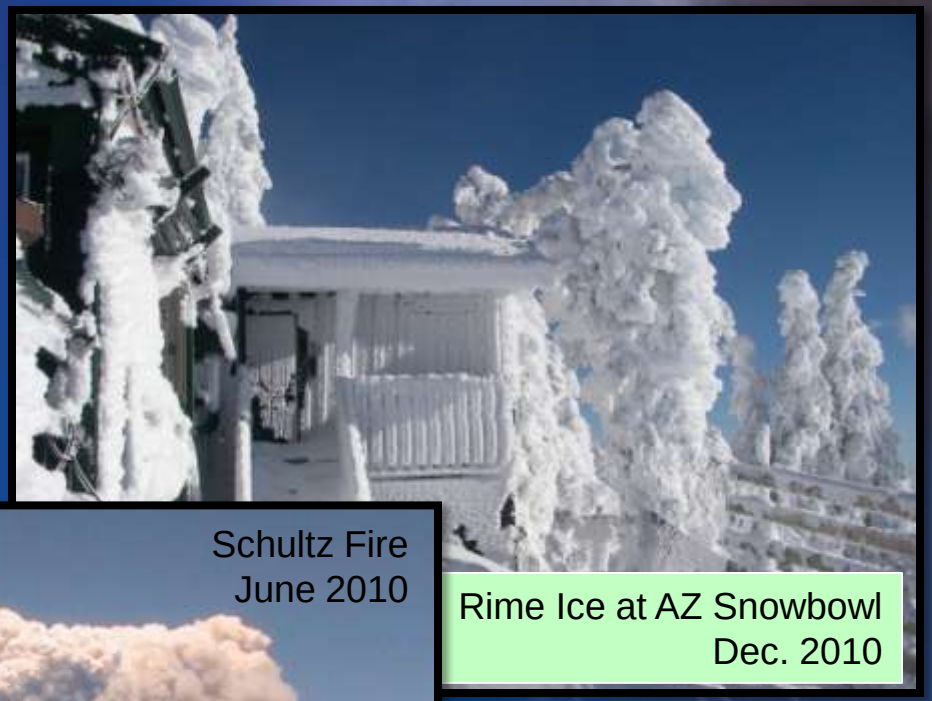
THE NORTHLAND OBSERVER

A Publication for the Dedicated Weather Spotters Serving the NWS Office in Flagstaff, Arizona

2011 Monsoon Edition

NWS Flagstaff
January 2010



Rime Ice at AZ Snowbowl
Dec. 2010

Schultz Fire
June 2010

Weather to Remember

Ken Daniel – Meteorologist & Spotter Program Leader

Rarely, it seems in relatively recent memory, has there been a more active period in Northern Arizona weather than over the last couple years. Numerous events garnered attention for multiple days in the national headlines. For instance, after the monsoon season had already officially ended in 2010, a tornado outbreak broke out across portions of Northern Arizona on October 6th, 2010. While individual tornadoes themselves are not necessarily rare in Arizona, the number of verified tornadoes during this outbreak was unprecedented in recorded history. At least 8 tornadoes had been confirmed by damage or observation, with other undocumented touch-downs possible. See the article on the tornado outbreak later in this newsletter for additional details.

A winter storm in January of 2010 (the 18th-23rd) brought the second greatest storm total snowfall in Flagstaff history at 54.2 inches, with Prescott also receiving its third highest snowfall total ever. Damaged and collapsed roofs, closed roads, and extended power outages were all too common, with areas of flooding also experienced in portions of Yavapai and Gila Counties.

In the spring of 2010, our typically windy conditions often appeared even more robust than normal. Blowing dust from gusty conditions closed portions of Interstate 40 between Flagstaff and Winslow around 10 times, causing traffic nightmares for tourists, residents, and long-haul truckers alike.

Weather to Remember...continued

Ken Daniel - Meteorologist

Fire seasons have been unprecedented as well. While last year saw the damaging Schultz Fire to the San Francisco Peaks and its resulting flooding problems, this year saw the Wallow fire become the largest wildfire in Arizona history. This devastating fire will also lead to flooding concerns throughout this monsoon season.

Most would say this last monsoon season was quite active, especially when compared to the 2009 season. At the Flagstaff Airport, daily rainfall of greater than an inch occurred 5 times! Only one other monsoon season had a greater frequency of these days, which was 1986 when this happened 6 times. In addition, both Payson and Williams experienced their wettest Julys on record.

What will this monsoon have in store? Only time will tell for certain, but check our climate outlook later in this newsletter for a taste of what may be to come.

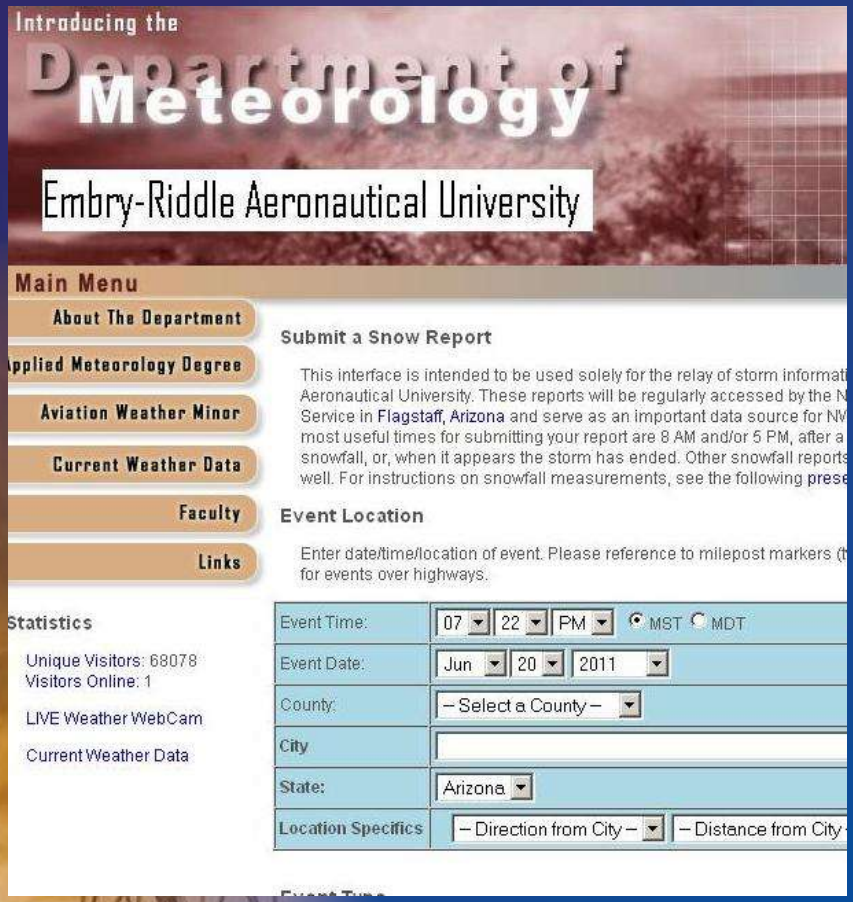
It is in these periods of extreme weather that you, our spotters, provide great service to our office, and as a result, the public at large. We appreciate your dedication and look forward to your continued assistance this summer and in the future.

What's New?
Web-based Spotter Reporting

You now have another option when reporting significant weather to our forecasters at NWS Flagstaff. In addition to the option of calling the spotter telephone line (888-745-1637) and relaying the conditions in your area, you can alternatively use a link on our webpage to pass on your important reports. Just click on 'Submit a Spotter Report' near the top of our homepage.

http://weather.gov/flagstaff

What's New?
Web-based Spotter Reporting...continued

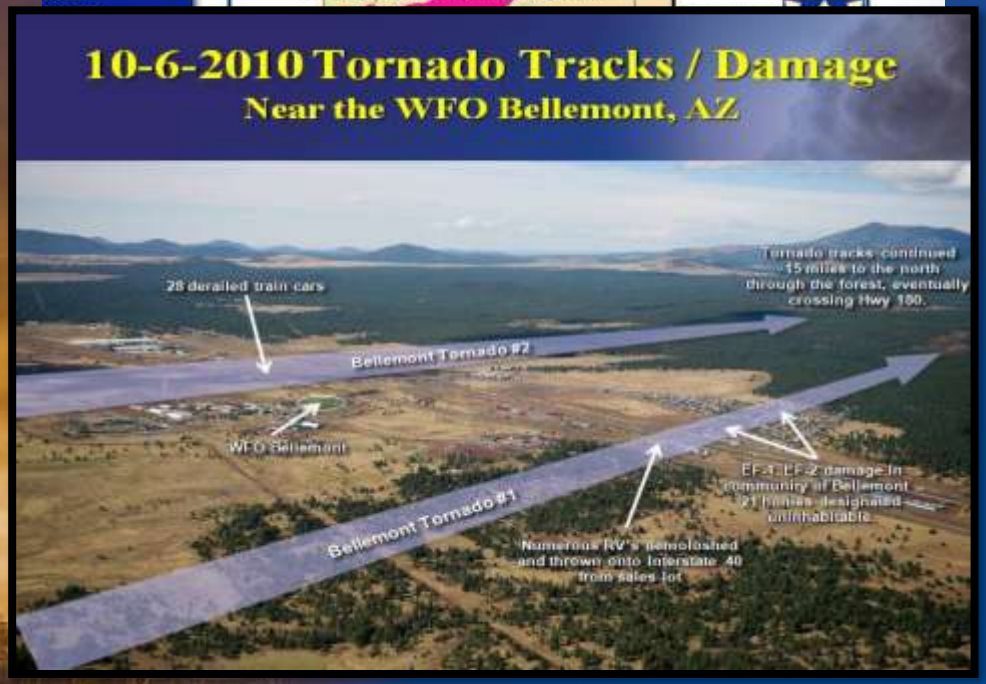


Though this will take you to an Embry-Riddle University website, rest assured that we receive the information nearly real-time. We partnered with their Department of Meteorology to provide this service. Simply fill out as much information as possible and submit your report! Please remember to add your phone number so that if we need clarifying information, we can contact you.

We continue to urge all our official spotters to report **vital** severe weather (like large hail, tornados, flooding, and extreme damaging winds) by calling the above spotter number as in the past.

Thanks – Your information is invaluable to our forecasts and warnings.

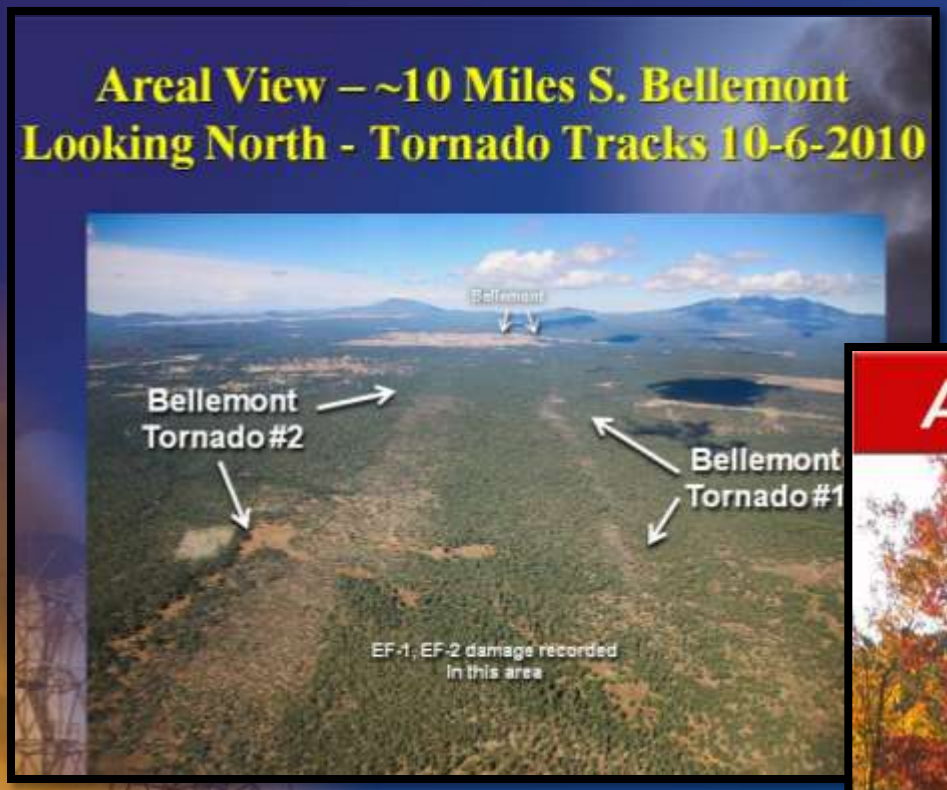
What Else is New?
Weather Stories on the Web



Those of you that are frequent visitors to our web site over the last year may have noticed a new service we are providing to the public. We have been producing one-page weather graphics we often like to call ‘weather stories’. When issued, they feature prominently near the top of our webpage and will often highlight the main weather impact or concern.

To paraphrase a popular saying, we feel these weather graphics are often worth a thousand words. Take a look at a few of the ones we’ve issued this last year and see if you agree.

What Else is New?
Weather Stories on the Web



What Else is New?
Weather Stories on the Web

Weather Spotter Spotlight

By Meteorologist Megan Schwitzer
Featuring Weather Spotter Scott Martin

Scott Martin
National Weather Service Spotter
KE7BIT
Amateur Radio Emergency Services Emergency Coordinator
SkyWarn Coordinator

To show our appreciation to our spotters and highlight the importance of their involvement in the Skywarn program, we will be featuring a story on one of our spotters with each newsletter issuance. As our first “Weather Spotter Spotlight”, we’d like to introduce Scott Martin…

Scott Martin is an active National Weather Service spotter in the Doney Park area just northeast of the city of Flagstaff. Scott has been involved with the Skywarn program for over two years now and has provided us with many important spotter reports, from snow and wind to severe weather! In his spare time, Scott enjoys a lot of outdoor activities, including hiking and horseback riding, and is also an artist and silversmith. While Scott has grown up with interests in nature and the outdoors, he’s gained an appreciation for the weather and providing accurate weather information. Scott’s earliest weather memory involved being drenched by a thunderstorm at a wedding in the Pacific Palisades when he was only four years old! Scott grew up in southern California, where one may think there’s not much weather to be interested in, but according to Scott, “when you surf, hike, and watch the forest burn down, weather becomes very important”!

Weather Spotter Spotlight …continued.

Featuring Weather Spotter Scott Martin

I asked Scott what kind of weather he reports most often and he said usually snowfall, but he also gives us frequent wind reports since Doney Park tends to be a windy location. I also asked Scott what the most significant event was that he has ever reported. It's no surprise that his answer involved the historical tornado outbreak from this past October! After forecasters in our office noticed a strong thunderstorm heading Scott's direction, he was called to validate whether or not there was rotation occurring within the storm. As it turned out, this particular cell did not produce a funnel cloud, but Scott said it was one of the scariest things he's encountered as he watched the storm track directly overhead. As scary as it was, Scott knew that the information he could provide us with was crucial and would help assist in our warning decisions to protect the public. What a great example of just how important your spotter reports are! According to Scott, the most rewarding thing about being a weather spotter is, "knowing that the information that I can provide will help produce the most accurate weather picture and could possibly help my neighbors and others passing through the area".

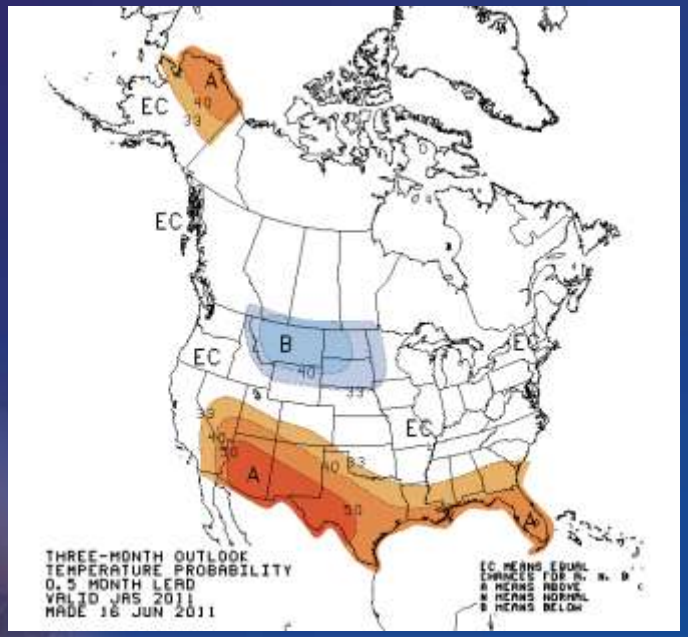
Scott also organized our local Amateur Radio club and has become the Skywarn coordinator for the local Amateur Radio operators. Scott used his Amateur Radio expertise during the Schultz Fire floods of last summer. He was able to relay digital radio signals from the APRS weather stations that were reporting rainfall amounts over the burn site. Amateur Radio is important to the weather spotter program because when all other communications fail, radio operators can provide reports to us and other agencies via radio signals. Scott's Amateur Radio skills also came in handy during last year's strong winter storms, where he was keeping radio links across most of northern Arizona in direct contact with the state EOC (Emergency Operations Center) in Tempe! Scott's dedication to this program is greatly appreciated by the Weather Service and all others that benefit from his information!

Thanks for all of your work and interest in this program, Scott!

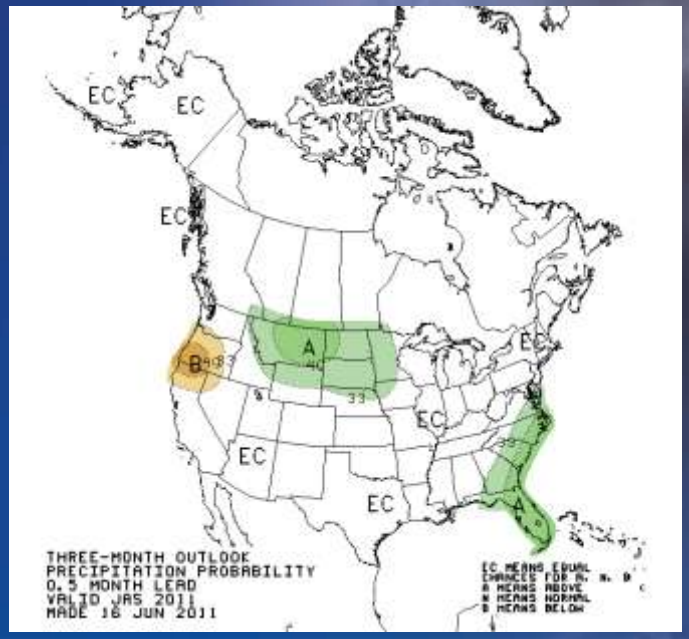
Summer/Monsoon 2011 Outlook

Megan Schwitzer - Meteorologist

Temperature Outlook



Precipitation Outlook



Although the designated Monsoon season officially started on June 15th, Arizona residents are still waiting for that welcome relief of cooler and wetter weather. The North American Monsoon is actually characterized by a shift in winds from a drier southwest wind to a more moist, southerly wind that draws up Pacific moisture primarily from the Gulf of California. Predicting the strength of the monsoon is difficult and can be variable from year to year. The graphics above show the official temperature and precipitation outlooks from the Climate Prediction Center for the months of July through September. The left graphic indicates an increased chance for above normal temperatures across much of Arizona and New Mexico through the summer season. The summer precipitation outlook indicates equal chances of above, near, and below normal precipitation, meaning there are no strong indications that this monsoon season will be any wetter or drier than a normal year.

Northern Arizona's Tornado Outbreak of 2010:
Not in Kansas Anymore, But You May Wish You Were

Brian Klimowski – Meteorologist in Charge

October 6th, 2011, is a date which will be long remembered for many in Northern Arizona. Whether it was the hours spent huddled in the hallways of a school or local business, the non-stop warnings and news reports about tornadoes in the area, or the damage that the storms caused to property; it was the date that the tornadoes hit Northern Arizona – in numbers far above any other day on record.

The tornado outbreak which occurred early that morning will go down as the greatest recorded tornado outbreak west of the Continental Divide. This was the 'big one' for tornadoes in the West, and it happened right here in our backyard. While a handful of tornadoes are reported each year in Arizona, damaging tornadoes are rare. Having multiple long-track supercell tornadoes occurring in the same part of Arizona for several consecutive hours…is unprecedented.

It was 5:00 AM, 43 degrees, cloudy and breezy when the first tornado touched down south of Bellemont. Not exactly tornado weather…but this was no ordinary tornado outbreak. Unusually strong low pressure was parked over Central California for several days, allowing for moist air to stream into the area and very strong winds to develop in the upper atmosphere. Severe hailstorms occurred near Phoenix on October 5th, the day before the tornado outbreak - an indication of the power of the storm system lurking in the area. Conditions were ripe for strong, rotating thunderstorms, even with the winter-like temperatures across the area.

Most of the damage from the tornadoes was concentrated just west of Flagstaff. The community of Bellemont had over 120 homes and several businesses damaged. In the forest just south of this area, vast swaths of trees were completely toppled or uprooted. At least 4 tornadoes moved through a narrow area south of Bellemont from 5:00 AM to 9:20 AM MST. Meteorologists have spent many hours closely examining the *pattern* of the fallen trees in this area. It isn't always straightforward determining whether observed damage is from tornadoes or straight-line (non-tornadic) winds. In this case, examination of the damage made it clear that the observed damage was caused by tornadoes.

Northern Arizona's Tornado Outbreak of 2010:
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Brian Klimowski – Meteorologist in Charge

Here are the official numbers for the Oct 6th tornado outbreak: 8+ confirmed tornadoes; 1 rated EF-3 (winds to 165 mph), 4 rated EF-2 (winds to 135 mph), 1 rated EF-1 (winds to 110 mph), and 2 tornadoes of unknown rating (EF-0).

The following images represent some of the data meteorologists look at when issuing tornado warnings, and then later when confirming the tornado presence and strength.

Doppler radar imagery illustrating the strong rotation within the tornadic storm 10 minutes prior to striking the Bellemont area. The areas of red indicate winds blowing away from the radar (white arrow), the green areas indicate wind blowing toward the radar.

Several businesses were destroyed along Interstate 40 west of Flagstaff.

The direction of fallen trees is closely studied to determine what type of storm may have caused the damage. Here, most of the trees fell to the *left* of the storm path, indicating the presence of a tornadic storm. The pattern isn't more circular due to thunderstorm motion.

Monsoon Season Reporting Criteria

A Refresher on What to Report

FUNNEL CLOUD OR TORNADO	Watch for rotation in cloud and any damage
HAIL - the measurements refer to the diameter of the hail stone	Pea-sized = 1/3” Penny = ¾” Nickel = 7/8” Quarter = 1“ Half Dollar = 1 ¼” Ping Pong Ball = 1 ½” Golf Ball = 1 ¾” Tennis ball = 2 ½“
HEAVY RAINFALL	One half (0.50) inch or more in one hour
FLOODING	Of any kind. Is water still rising or is it falling? What is the name of the creek, river, etc?
POOR VISIBILITY	One quarter mile or less in blowing dust, snow, fog, etc.
STRONG OR DAMAGING WINDS	Wind speeds estimates in MPH 39-54 twigs break off trees, wind impedes walking 55-72 shallow rooted trees pushed over 73-112 Peels off roof surfaces, windows broken

What's Coming in Next Newsletter?

- Overview of the 2011 Monsoon Season
- What's Ahead for the Winter
- Recruiting Spotters to Report 2 Times a Day During Snow Events for Some of Our Select Cities
- Weather Spotter Spotlight – Who will it be next time?!